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REHABILITATION OF THE CARDIAC PATIENT IN INDUSTRY AND IN THE HOME*

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BLAISE PASCAL, the philosopher and mathematician who published his contributions to the theory of probabilities in 1654, significantly affected medical progress by the impact of his ideas on scientific method. It is said of him that once, after writing a letter to a friend and signing it, he became acutely aware of its great length. He therefore added this postscript, "Please excuse the length of this letter, I did not have the time to write a short one." Your President gave me ample time – many months – to prepare my piece for this evening. After having written a long communication on rehabilitation of the cardiac patient, I crystallized its essential elements in a few sentences. Here they are.

An optimistic prognosis is more often right than wrong. The appraisal of fitness for work requires knowledge of both the kind and the degree of organic disease plus an estimate of the patient's motivation with respect to work. In selecting a suitable job, not only the interests of the patient but also the safety and interests of his co-workers and the interests of the employer must be given due emphasis. Performance at the job is the ultimate measure of the individual's capacity for work. Work usually serves as a good tonic for the morale of both the rehabilitated cardiac patient and his co-workers.

While preparing for this evening's exercise, I became more conscious than ever before of the simple yet not too obvious fact that rehabilitation of the cardiac patient begins when the diagnosis of cardiovascular disease is made for the first time. On this occasion, the patient leaves the physician's office with the new knowledge about his health which makes an important change in his point of view towards all the functions of his life, at work or at play. The physician, with his medical knowledge, makes an estimate of the patient's capacity for work and prescribes accordingly. When the physician says "You must take things easy," he prescribes restrictions and prohibitions which affect all of the patient's daily activities; and when the physician adds, usually as he sees the patient to the door, "Don't worry," he prescribes for the emotions. Brevity is an admirable goal but it should not be overshot. The words, "don't worry" are usually misunderstood; they often initiate the kind of anxiety that produces iatrogenic cardiac neurosis. The words "take things easy" leave it to the patient to determine his restrictions and prohibitions. One type of person will exaggerate and another type will minimize the need for changes in his habits. Rarely we do meet with a patient who has a natural endowment of wisdom. This patient, by trial and error, measures the limits of his capacity to work and to play and defines his prescription for taking things easy in terms of these measurements. From him we learn how to guide others for whom we must spell out the meaning of "take things easy" in terms of the functions of everyday life in each given case. The physician who has devoted adequate time to this does not need to utter the words "don't worry"; they are superfluous, misleading and may do more harm than good. In spelling out the meaning of the expression "take things easy" I seek to emphasize the positive elements. The things which the patient should do and the manner in which he should work and play are discussed. He is encouraged to ignore those items which he is to avoid; the prohibited elements hardly need be mentioned if the permitted ones are given full coverage.

The physician occupies the post of leader and co-ordinator in rehabilitating the cardiac patient. The physician has the main task of appraising fitness for work and must guide in the selection of a suitable job. To estimate the prognosis for duration of life itself, the prognosis for duration of life as a gainful worker and the probable frequency and duration of absences from work, the physician requires his usual medical diagnostic facts, plus advice from the social service worker or a suitable equivalent, and from a job analyst or a suitable equivalent. The co-operation of the employer and of the fellow employees may determine the ultimate success or failure of the plan for rehabilitation, however reasonable, logical and promising it may be. My own experience has been that in most instances the physician himself has functioned as the social service worker, the job analyst and the social science advocate to enlist the co-operation of employer and employees. The task of deciding whether the individual is fit for some form of work and then determining the nature of the work he should do remains one of treating each case separately. One single diagnostic label may

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describe the pathological lesion in a score of individuals, yet each of these may belong to a different category with respect to fitness for work. To distinguish the degree of impairment of cardiac function and to measure the capacity of the individual man or woman as a productive worker calls for recognition of various degrees of abnormality represented by a particular diagnostic label.

CONGENITAL HEART DISEASE

When signs of congenital heart disease are discovered in an infant or child, the parents ask two logical questions: Will the child live? Will the child be able to play and to work? When we can say yes in answer to the first question, we are faced with the task of estimating the prognosis of an entire life, its duration, the rate of development of the individual and his capacity for physical and mental exertion. When in doubt I think the physician should be guided by the principle that a good prognosis is more often right than wrong. This view gains additional support at present from the important advances being made in the surgical treatment of congenital cardiovascular disease. Abnormalities for which no direct therapy existed only five years ago are now brilliantly corrected. About two weeks ago, at the World Congress of Cardiology, I witnessed Dr. C. Walton Lillehei's description of an operation in which he and his team of co-workers opened the heart of a child, sewed up and closed the interventricular septal defect and corrected the stenosis of the pulmonary valve in a case of tetralogy of Fallot. Thus the two main abnormalities of this condition were corrected directly. Such cardiac surgery prolongs life and increases the patient's capacity for work and play.

People with obvious signs of congenital cardiac anomalies come to our attention at the pre-employment medical examination. The industrial physician may have the privilege of being the first to recognize patent ductus arteriosus, coarctation of the aorta, or uncomplicated pulmonary stenosis, conditions which can be corrected by surgical operations which now involve very little risk and result in prolongation of life itself and of life as a productive worker. These people should be guided towards surgical therapy. In most instances the operation should be performed before the individual is assigned to a job. However, when circumstances do not permit this course, suitable employment should be given and the operation should be performed within a reasonable period of time, measured in terms of months and not of years. A case of this kind came to our attention in January 1949.

R.M., a boy of 18, applied for employment in a large retail firm; the industrial physician found the blood pressure too high for his age and rejected him. This was the first time his blood pressure had been measured. He had had a number of medical examinations including those at school and was invariably pronounced normal. He then sought employment as a clerk in the Canadian National Railways and was examined by Dr. Peter Vaughn, who heard a loud aortic systolic murmur and, finding the blood pressure in the arms 170 systolic and 100 diastolic, measured the blood pressure in the legs; he could not hear any sounds over the popliteal arteries; x-ray examination of the chest revealed the notching of rib margins which confirmed the diagnosis of coarctation of the aorta. We advised and persuaded the boy and his mother to have the operation performed and it was done six months later. The boy made an uneventful recovery and then applied for the job in the large retail firm whose physician had rejected him. He obtained the job he wanted. On this occasion the blood pressure was about 130 systolic and 80 diastolic. I saw him six months later and he declared he felt no different as a result of the operation. He was and is very fortunate. Our examination before the operation revealed not only hypertension in the arms, but also a loud, long coarse systolic murmur, loudest over the aortic area. If this murmur had been detected by at least one of the physicians who examined him in early youth, he might have had limitations forcibly imposed on him and we may now judge that these restrictions and prohibitions would really have been unjustified. He escaped them and reached Dr. Peter Vaughn only a year or so after the operation for coarctation of the aorta had become feasible. Now he is free from the possibility of developing those disabilities which result from coarctation of the aorta, and can pass medical examinations related to employment or life insurance without any difficulty.

A loud systolic murmur may represent one of the congenital anomalies for which no surgical operation has yet been devised successfully, such as the Eisenmenger syndrome. For auricular and ventricular septal defects operations have been performed which promise to become established. Uncomplicated septal defects do not impair cardiac function significantly. The principal source of danger is that of acute or subacute bacterial endocarditis, which may develop on the margin of the defect. Fortunately we now live in the era of antibiotics; we can both prevent and cure such endocarditis in about 90% of cases if the condition is recognized and treated early. Thus people with congenital cardiac anomalies without cyanosis should not be rejected at the pre-employment examination. They should be guided into jobs that do not require heavy physical exertion. We do not know enough to be sure that they could engage in heavy work for as long as a normal person.

People with congenital cardiac anomalies who

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show evidence of cyanosis suffer from disability to a degree which makes them unfit for ordinary conditions of employment. They require liberal, sympathetic consideration. Under suitable circumstances they can be productive workers who, incidentally, serve to raise the morale of their healthy co-workers.

In 1930 I began to attend a girl of 16 who had been a blue baby and presented the signs of tetralogy of Fallot. She was considerably disabled by shortness of breath and fatigue but was able to work as a saleswoman until she married at the age of 21. Her husband did the heavier house work and they managed quite well until he became interested in another girl several years later. In this unhappy state, in 1944, she resolved to do her bit of war work. She painted her blue fingernails red and applied lipstick to camouflage her blue lips; thus she passed the pre-employment medical examination in a defence plant. She reported this to me after she had been working at assembling an electrical gadget in an aeroplane factory for six months. She devoted all her non-working time to rest and felt quite well during these six months, quite as well as when she had not been working. Four years later she became almost totally disabled and at her insistence the Blalock-Taussig operation was performed although because of her age, about 35, she was a very bad surgical risk. She died 24 hours after the operation, of hæmorrhage from the site of arterial anastomosis. The story of this young woman exemplifies the significance of motivation in rehabilitation of the cardiac in industry.

A man of about 39 who was found to have heart disease at birth began to have cyanosis at 15. As a boy, he had to walk more slowly than other children and could not run, but he had normal schooling and became a mechanic in an aeroplane factory. In 1939 he fled from the Germans when they invaded his native Poland. He marched many miles and made his way through Roumania, Yugoslavia, France and Spain to Portugal, whence he came to Canada in 1942. Here he worked in a machine shop, occasionally lifting as much as 50 pounds. But in the summer of 1952 he began to have more dyspnœa than usual and œdema of the legs. This brought him to me. The studies led to the diagnosis of probable Eisenmenger syndrome with right to left shunt and marked cyanosis, and thus he could not be helped by surgery. He was totally disabled and he died a year later at the age of 40.

His story also shows the range of capacity for exertion which a person with a cyanotic type of congenital heart disease can endure if properly motivated. In these individuals the fitness for work cannot be deduced from the diagnosis alone; it must be determined in terms of the person's performance at work. Would he have fared better if he had lived a more protected life? This reasonable question cannot be answered categorically. This man would have been extremely unhappy if he had not worked at a regular job. He would not have obeyed any doctor who might have advised him to avoid work. He had no regrets. The fullness of a life is not to be measured by its length alone. This view plays a significant role in my calculations as I assess a patient's fitness for work and play. To the estimate of the degree of physical disability must be added an appraisal of the individual's motivation. An obstinate anxiety neurosis leads the patient along a path of life that may perhaps be longer but is rather barren and joyless. I need not describe cases of this kind, for you are all familiar with them; they occur with and without organic disease.

RHEUMATIC HEART DISEASE

Rheumatic fever and rheumatic heart disease occur at all ages but most frequently before the age of 20. Recurrences of rheumatic fever call for long absences from work, lasting three to six months or longer. The life expectancy in those who develop tight mitral stenosis may now be increased by the operation of commissurotomy, and the surgeons are developing techniques for the treatment of aortic stenosis, aortic insufficiency, mitral insufficiency and tricuspid disease. These favourable features, however, affect only a portion of the whole problem of rheumatic heart disease from the point of view of appraising fitness for work. It is useful to know that rheumatic fever rarely occurs after the age of 20 and even more rarely after 25. The precise pattern of heart sounds and murmurs correlated with fluoroscopic study of the chest and the electrocardiogram provides evidence for an accurate estimate of the degree of valvular and myocardial disease. Thus the diagnostic label can be qualified. To state that there is mitral stenosis is not enough. The degree of stenosis must also be recognized, and this is true of mitral insufficiency or aortic insufficiency and stenosis or tricuspid valve disease. Small degrees of valvular deformity do not significantly impair the capacity for work or shorten the duration of life. Young people with marked button-hole type of mitral stenosis are frequently unaware of any disability until they reach the early thirties. Respiratory infections may light up arrested rheumatic lesions and are the greatest source of danger to these patients. Those with a large heart are less likely to work regularly until the age of 50 to 60 than those with a heart of normal size. All patients with rheumatic valvular disease share the common danger of developing subacute or acute bacterial endocarditis. They should know that antibiotics such as penicillin administered during an infection or a surgical operation as minor as a tooth extraction are

effective in preventing the development of subacute or acute bacterial endocarditis. The appearance of fever should invariably lead to a search for signs of this disease, and in some instances thorough treatment should be administered even if blood cultures are sterile. These measures save lives and reduce the duration of absenteeism from work.

The story of a railway office clerk who died at the age of 56 will show how the problems of rehabilitation may be met in a case of aortic stenosis of marked degree with moderate degree of aortic insufficiency and mitral stenosis. He was born in Montreal in 1895 and had scarlet fever at the age of two years. He recalled no other illness when I first saw him at the age of 44. However, he served in a Canadian infantry regiment from 1915 to 1918. In the winter of 1918, after a leave in England, he was about to return to France and was examined by a medical officer. On this occasion heart disease was found which led to his being returned to Canada and discharged from the Army. He probably developed this valvular disease after scarlet fever and before the age of 15.

He returned to work as a clerk and remained in good health until one night in 1920 when he was awakened from sleep at 4 a.m. by severe pain in the front of the chest. This pain lasted half an hour. His family physician diagnosed heart disease and, although no fever was present and there was no recurrence of pain, the treatment consisted of eight months of rest in bed. I did not dare enquire further why he had been in bed so long, but I admired him as a man because he showed no trace of the cardiac neurosis which usually results from such therapy. When I first saw him in 1939 he reported that he had developed a cold three days previously and during this time he had spells of tightness in the front of the chest both at rest and on exertion, each lasting about half an hour. The signs of aortic and mitral valve disease mentioned above were found and the heart was about double the size of a normal heart. A week of rest on a convalescent regimen and observation of temperature was prescribed as well as nitroglycerin for the relief of the pain. At the end of this time he reported that he had no fever, and as the cold disappeared the pain ceased to recur. He returned to work after a second week of convalescence.

During the next nine years he worked regularly. About once a year he had a cold which caused him to remain at home for a few days but there was no recurrence of the chest pain. In the winter of 1948 he had influenza; following this illness his general strength diminished and he was treated with convalescence in the military hospital. During that year he had low-grade rheumatic fever and spent about two months in the military hospital. Then his general strength became so impaired that he was totally disabled before signs of congestive cardiac insufficiency developed. He died two years after he stopped working.

Thus he had worked effectively from about the age of 15 to 54 and also served in the Canadian infantry from the age of 20 to 23. He wisely chose the work of a clerk. He was unfortunate in his susceptibility to respiratory infection, or he might have worked until his early sixties. Should we reject a youth of 15 who seeks a job, because he has such rheumatic heart disease? In my opinion this typical story calls for advising this youth to take a job which does not involve heavy work or exposure to bad weather and encouraging him to live a full life, practising moderation both at work and at play. If this policy is justified in a case of rather severe rheumatic heart disease, it certainly applies to those who have only moderate or slight degrees of this disease.

The career of a girl with rheumatic heart disease and marked mitral stenosis involves consideration of her fitness for marriage and motherhood. When I returned from my travels in training and began to do clinical work in Montreal I met with some cases of young women who had been advised or ordered not to marry and not to have children because heart disease, a murmur, had been found. This seemed to be serious misguidance. By the principles popularized by Sir James Mackenzie, namely that dyspnœa and pain on exertion are the main guides to measuring cardiac function, these young women were fit to do a good day's work. They were therefore fit for marriage and motherhood. The older physicians, however, were able to cite the stories of patients whose lives were shortened abruptly or gradually by effects of multiple pregnancies plus the work of a housewife. These could be matched by cases of patients with similar signs of heart disease who lived the normal span of life carrying out the functions of wife and mother happily and successfully. Yet we could not ignore the fact that, especially in cases of marked mitral stenosis, pregnancy is apt to induce acute pulmonary œdema which may prove fatal. All these problems continue to come before us in bold relief. We know that some people with button-hole mitral stenosis live to the seventies enjoying work and play like normal individuals. We are very familiar with others who present the same clinical picture in early youth but who soon develop congestive cardiac failure which shortens their lives to half or a third of the normal span.

I know of no formula by which these two types and the intermediate variations may be identified in the teens or twenties. At this juncture again I think it wise to invoke the generalization that a good prognosis is more often right than wrong. The plans for the life of a young girl with marked mitral stenosis are drawn on the assumption that she will live the normal span or very little less. From the statistical studies of morbidity we have learned that,

in most instances, such young women remain free from symptoms of a disabling degree until they reach the early thirties. This is true no matter what kind of work they do, and not uncommonly good tennis players are found among them. Congestive cardiac insufficiency with obvious œdema of the lower extremities tends to appear in the forties or early fifties. Modern methods of treatment, especially with the mercurial diuretics, significantly reduce the degree of illness and prolong life at this stage which may continue well into the sixties or seventies.

These views on prognosis plus an optimistic outlook in general lead to giving the girl of 17 who has signs of marked mitral stenosis the following advice. "Young lady, one of the four valves in your heart is narrowed. This sounds very bad, but it is not as bad as it sounds. The body has wonderful powers of adjustment and your body is making the necessary corrective adjustments. You know this because you now feel well. And now is a good time for you to plan your career so as to conserve and prolong this sense of well-being. You will be well advised to marry at a young age, close to about 20. Until about 30 or 35 your strength will be at its best. By having your children, usually two, in the first years of marriage, you make good use of your best years to rear them. Then when they can do things for themselves and also for you the adjustments which you may have to make in your thirties because you will tend to feel tired more readily than before can be achieved easily and gracefully. Moreover, the life of a wife and mother is a better one for you than that of a career girl in one of the professions or in business. At home you can do your work at your own speed and take rests whenever you please. At work you must punch a clock and conform to rules which are made for stronger members of the group."

As I have been giving this type of advice since about 1928, I have had occasion to observe its effects during about twenty-five years. One of the major problems which confront me from time to time is the woman between 35 and 40 who still feels well and becomes pregnant, unexpectedly, ten or fifteen years after her last pregnancy. I then pursue the logic of my initial advice and prescribe a therapeutic abortion with tying of the Fallopian tubes. When this is not possible or, as happened recently, the couple preferred to take the risks in order to have a third child, I advise measures which are designed to reduce the demands on the mother to only what she can do comfortably. I underline the fact that once the child is born the great danger lies in the work required to care for it. In these twenty-five years I have seen only two deaths from acute pulmonary œdema during pregnancy. One in 1936 was that of a primipara aged 25 and the second, in September 1954, of a woman of 39 who had had two children in the early years of her marriage. Having become pregnant in spite of advice given in 1952 against undertaking a pregnancy in her late thirties, she and her husband agreed to take the necessary risks and refused to have a therapeutic abortion. She remained quite well until one day in her fifth month when she suddenly developed acute pulmonary œdema. By the time she reached the hospital, within less than an hour, she was in shock and soon died. On the other hand we must recall the many examples of women now in their fifties and sixties, suffering from congestive cardiac failure due to marked mitral stenosis, who have had more than three and in some cases as many as ten children. Recent statistical analyses, notably one by Maynard of New York, indicate that the morbidity during and immediately after pregnancy is not significantly greater in cardiacs than in normal women in clinics in which known cardiacs are given the special attention they require.

In the past six years surgical techniques for the correction of valvular deformities, especially mitral stenosis, have become effective in restoring better health to the majority of those who survive the operation and the mortality in well-selected cases is being reduced to about 10%. The question arises, when in the lifetime of a patient with marked mitral stenosis should the operation of commissurotomy be recommended? Those who favour operating early when no symptoms or signs of cardiac insufficiency exist urge the value of prevention of these developments. They argue simply. There is an obstruction to the flow of blood from the left auricle to the left ventricle at the stenosed mitral valve. Let the surgeon remove this obstruction. Those who favour postponing the operation until symptoms of cardiac insufficiency occur support their stand by citing the likelihood of re-establishment of mitral stenosis if the operation is performed before the age of 25 when rheumatic fever may recur. They

prefer to avoid the surgical risk of 10% or more, in a person who has a satisfactory sense of well-being. They argue that such a major operation can be justified mainly if it is performed to relieve symptoms which impair the daily life of the individual. At present I belong to this latter school of thought and would not advise commissurotomy in the case of the 17-year-old girl in preparation for a career of work or for marriage. I would have in mind the likelihood that the operation might be indicated when she reaches her early thirties. Even in its present form the operation involves no greater risk at between 30 and 55 than under 30 years of age, according to the experience of Glover and his colleagues.[3]

HYPERTENSION

The most common and the least understood form of cardiovascular disease is that related to hypertension. Occasionally a specific cause such as a phaeochromocytoma or a Goldblatt syndrome kidney may be treated surgically. In more than 95% of cases we deal with essential hypertension. The signals which guide in differentiating various degrees of illness for estimating prognosis are not yet sharply defined. However, there is some reasonableness in separating those who show no objective evidence of cardiac, renal or cerebral disease and in considering them as mild cases with the better prognosis. Among the remainder there are those who are already totally disabled and those who are only partially disabled. In this third group we find the people who might benefit most from surgical treatment with sympathectomy. In the first group there are men and women who will eventually enter the other two groups and there are others who will live to the seventies and eighties and have no more disability than people with normal blood pressure.

One guide which tends to distinguish between these two types is the diastolic pressure; those with levels of 120 mm. or more are good candidates for the development of significant cardiovascular disease. Systolic hypertension with normal diastolic blood pressure is relatively insignificant. About twenty years ago Dr. A. E. Gilchrist of the Canadian National Railways Clinic made a survey of the blood pressure in locomotive engineers and firemen. From this study we learned to abandon the life insurance limits of normal, 140 systolic and 90 diastolic, and we raised the normal systolic to the vicinity of 170 systolic and the diastolic to the vicinity of 110 for middle-aged men. This was and is important to the men and the company. If the lower levels had not been raised, a very large number of men would have been retired unnecessarily and prematurely.

In the absence of knowledge about the specific cause and control of essential hypertension we must rely on good judgement in dealing with each case; to me this means, among other things, to avoid being guided by inspired preconceived notions in the routine management of these people. There is one exception, however; I would approve of inspired optimism in viewing prognosis. Those patients who show no evidence of disease in the heart, brain or kidneys should be allowed to continue at their usual occupations. The remainder should be managed according to the degree of disability. Those with a high diastolic pressure should be steered away from heavy or hazardous jobs. I recently had the unhappy experience of strongly recommending that a civil air pilot of more than 20 years' standing should be permanently "grounded" at the age of 44 because of a fixed diastolic and systolic essential hypertension.

CORONARY HEART DISEASE

Coronary artery disease usually strikes the middle-aged man, often an employee of many years' service who has identified his emotional life with the interests of the company. It is common knowledge that such an illness requires about six weeks of rest and then several weeks of convalescence. This makes for much inconvenience to the patient and to the company, but usually both are considerate and co-operative. Presently, if not on the very first day of the illness, the physician faces the question from the patient, "Will I be able to go back to work?" and from the company "How much will he be able to do after the eight or 10 weeks are over?" Very early in my career as a practising physician, I learned that the most potent medication a physician could give such a patient when he first sees him is to declare that after the usual period of rest he will return to his usual job. Nothing is more effective in relieving anxiety and in preventing cardiac neurosis. This statement is good medication at any stage of the illness. The response of the patient almost invariably consists of gratefulness for the good news. In some, fortunately a minority, reflection brings doubts and fears of

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anxiety neurosis which partially or wholly disables him as a gainful worker. The majority enjoy the great pleasure of returning to work, at first on a part-time schedule for the first few weeks and then on a full-time basis.

When asked about recurrence of coronary artery disease, the wise physician clearly declares that no satisfactory methods of prevention are known at present. The patient's situation remains essentially the same as that of any man of his age; no one can predict who will and who will not have this illness one or more times. The patient must settle down with the well-known philosophy, "Work and play well each day and don't bother about tomorrow." At this point motivation plays a dominant role in the progress of the patient. To some extent this can be seen in the statistical analysis of a group of 178 persons who survived one or more attacks of acute coronary artery disease with myocardial infarction.[1] These patients were observed by me from 1926 to 1939. The largest proportion, 73%, returned to work in the age group of 40 to 49. At this age the responsibilities of a growing family and of a progressive career tend to encourage optimism and good motivation for returning to work.

In the older age groups the reduction of urgent responsibilities makes for rationalization of the decision to retire from work. Master and his associates[2] performed the laborious task of analyzing the circumstances under which 1,000 attacks of acute coronary artery disease occurred and found that only about 1% developed during heavy work; in the majority of cases the attack began when the patient was at rest. We can feel secure in stating that there is little if any direct relation between work and the cause of coronary artery occlusion. This helps to assure the patient, his employer and fellow-employees that work will do no harm. Of course, on general principles, he should be steered away from hazardous or very heavy work.

When there is evidence of congestive cardiac insufficiency or frequent recurrence of cardiac pain at rest as well as on walking outdoors, the worker must be considered as temporarily and probably totally disabled. However, I would like to underline the fact that cardiac pain of chronic coronary artery disease, so-called angina pectoris, occurs readily after a few minutes of walking outdoors and fails to appear when the man walks indoors. Thus, a foreman who spends his whole day walking the length and breadth of a large plant, free from any symptoms, develops cardiac pain as he walks for five or less minutes from the streetcar. Such a man is fit to continue his work as a foreman. However, when he begins to develop pain as he walks indoors it usually means an increase in the degree of disease and this must be taken as a signal of possible impending acute coronary artery disease. He should be advised to rest at home for at least two weeks and if pain should recur at rest his status must be interpreted in the light of adequate clinical investigation. If he remains free from pain for 14 consecutive days, he may then return to work, on a part-time schedule, as a test of his fitness. If he reverts to his previous state of no pain while walking in the plant, he may continue to work.

The immediate and the ultimate prognosis in a given case of coronary artery disease cannot be measured accurately. An optimistic estimate, I think, is more often right than wrong, and so I continue to make optimistic prognoses and encourage all concerned to have the patient continue at suitable work as long as he shows the capacity to perform his task comfortably. This principle is also applied to cases of congestive cardiac insufficiency controlled with digitalis and mercurial diuretics. Patients who might have lived only one or two years 25 years ago, now live ten or more years after the onset of pulmonary or peripheral œdema or both. The therapy is so effective that they are fit for light work during these years. Given good motivation, they do lead wholesome, useful lives in spite of gross signs of quite severe heart disease.

The privilege of delivering this communication affords me the welcome opportunity of speaking about a person of high courage and good sense who taught me much about the subject of rehabilitation. On May 9, 1949, I wrote the following clinical note about him:

"Mr. T. is a wonderful example of what persistence, courage and good stamina can perform. Other people with the degree of illness that he has would be almost bed-ridden. He is doing a full day's work; true, rather light work in an atmosphere of generous people, but he does go to work every day in all kinds of weather and has the feeling of a man who is supporting himself."

He first came to my attention in July of 1944 when he was 62 years old and a locomotive engineer. The clinical history indicated that he had had acute coronary artery disease with myocardial infarction seven weeks before; the treatment consisted in a week of rest at home and three weeks' holiday at his son's house. He had had chronic coronary artery disease pain (angina pectoris) only on walking outdoors for two years until

the acute coronary artery disease attack, then none. He wanted to return to his job and was referred to me for appraisal of his fitness for work. I found evidence of healed ventricular anterior wall infarct, paroxysmal left bundle branch block and moderate hypertension (180/110) but no signs of congestive cardiac insufficiency. I recommended light non-hazardous work and he was placed as second man on a Diesel engine. He worked regularly on this job for about a year, until he retired on a pension. As this was too small for his modest needs, he found a light job as a timekeeper in an industry situated 200 miles north of North Bay. Two years after retirement his main symptom was dyspnœa on walking or hurried exertion and he changed his job to one in Montreal as stock-room attendant in a large office. Here he was treated with special consideration by his boss, who had recently returned to work after a so-called "heart attack."

Thus he worked for three years in spite of moderate discomfort, but in the next three years he was disabled completely for periods of weeks or months by recurrence of acute left ventricular insufficiency with pulmonary œdema, by cerebral vascular disease resulting in transitory paresis of an arm and leg and permanent hemianopsia. During two of these three years he worked in the intervals between acute illnesses. In the final year, he was almost totally disabled by right ventricular insufficiency which was controlled partially with digitalis and mercurial diuretics. Even during this last year of relatively severe illness, he helped to earn some money by attending to the furnace and doing housework as he and his wife, who was also sick, rented some rooms of their house to boarders.

The story of this man exemplifies what a courageous, willing man achieved in adjusting himself to a wide variety of severe disabilities related to arteriosclerosis and hypertension. He did some form of work whenever he was not totally disabled. This man, who in his youth served his native country as a sailor on the battleship *Maine* in the Spanish-American War, lived gallantly, beyond the call of duty as a worker, at the end of his life. His pension should have been adequate for himself and his wife. Industry, insurance companies and the public represented by Government must take a more realistic attitude towards men and women in the age group of over 60. Physiological age and not chronological age should determine the time of complete retirement from work and then the pension should not be as obviously inadequate as it frequently is at present.

Iatrogenic Heart Disease

The family physician may have an emotional storm when he is consulted by a person who was rejected as an applicant for employment because the medical examination revealed a heart condition. The usual report is that the doctor said that there was "a murmur" or "high blood pressure" or "a leaky valve" or "enlarged heart." And in some instances the person began to notice palpitation since learning about his heart trouble. The emotional storm develops when the family physician finds no evidence of disease and is faced with the problem of treating iatrogenic heart disease. He must, however, be patient; we are each entitled to an opinion. Moreover, who can define precisely what is normal? There is no specific "normal"; there is a "range of normal." With these thoughts in mind the two physicians should discuss the problem. The iatrogenic heart disease will be most effectively cured when it becomes possible for the industrial physician to include his observations within the "range of normal." Having in mind the fact that minor, slight deformities of cardiac valves do not impair cardiac function, it is safer to err by including a given case as within the "range of normal" than to err by fixing the label of heart disease on a person who has none. This is true also for transient hypertension or arrhythmias.

In preparing this communication I have been guided by the general principles stated at the beginning and now repeated in conclusion:

1. An optimistic prognosis is more often right than wrong.
2. The appraisal of fitness for work requires knowledge of both the kind and the degree of organic disease and an estimate of the patient's motivation with respect to work.
3. In selecting a suitable job not only the interests of the patient, but the safety and interests of his co-workers and the interests of his employer must be given due emphasis.
4. Performance at the job is the ultimate measure of the individual's capacity for work.
5. Work usually serves as a good tonic to the morale of both the rehabilitated cardiac and his co-workers.

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WEATHER AND MYOCARDIAL INFARCTION

Two authors from Texas have analyzed the relationship between sudden changes in weather and the onset of myocardial infarction in a series of 1,386 patients. They find a definite increase in this condition during periods of sudden inflow of polar and tropical air masses. —Teng, H. C. and Heyer, H. E.: *Am. Heart J.*, 49: 9, 1955.